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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/786,359  
Filing Date: February 24, 2004  
Appellant(s): FREEMAN ET AL.

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G. Roger Lee  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 22 December 2009 appealing from the Office action mailed 20 May 2008.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

6,390,996	Halperin et al.	5-2002
5,211,179	Haberl et al.	5-1993

**(9) Grounds of Rejection**

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The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 7-16, 19, 23, 26 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Halperin et al. (US Patent no. 6,390,996).

In regard to claim 1, Halperin et al. describe a CPR chest compression monitor that aids in application of CPR therapy. The monitor 10 records a physiological signal, i.e., ECG, as well as output from a velocity sensors 24 and 25, col 10 lines 32-34. Halperin et al. provide explicit teaching for “using the information on the velocity to reduce at least one signal artifact in the physiological signal resulting from the chest compression,” col 3 lines 1-10, 33-36, 52-55, and 65-67 – col 4 lines 1-5, 10-14, col 9 line 64 – col 10 line 6, and col 11 lines 40-49, and therefore substantially anticipates the method as claimed. Further, Halperin et al. teach that the CPR induced artifact may stem from force, acceleration, velocity, motion, etc, col 11 lines 50-55.

In regard to claim 2, the physiological signal of Halperin et al. is an ECG.

In regard to claim 7, the artifact sensor may be a velocity sensor in the form of gyro 24 and 25, col 10 lines 32-34.

In regard to claim 8, the displacement sensor is an accelerometer 12, which can be integrated by microprocessor 28, col 6 lines 11-19.

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In regard to claims 9 and 26, Halperin et al. teach that the CPR induced artifact may stem from force, acceleration, velocity, motion, etc, col 11 lines 50-55. The acquired signals (e.g., ECG and acceleration data) are overlapped and aligned in both time and frequency space in order to reduce signal artifact, col 11 line 59 – col 12 line 7.

In regard to claims 10, 12, and 28, the invention described by Halperin et al. uses a linear predicative filtering system and automatically adjusts for removing chest compression artifact, col 12 lines 2-19. A Kalman filter may be used, col 11 lines 4-5. In regard to claims 11 and 13, the invention of Halperin et al. has defibrillation electrodes 62 which can administer defibrillation shocks, col 9 lines 57-60, in the event that a ventricular defibrillation occurs, col 1 lines 41-47, which Halperin et al. teach is the main form of cardiac arrest. The predictive filtering technique is considered to by an adaptive technique.

In regard to claims 14-16,  $e_m$  is the physiological signal before filtering out of the artifact, and  $e_m'$  is the result of the filtering, and is the pure ECG signal, col 12 lines 12-19. The Examiner interprets this signal (i.e.,  $e_m'$ ) to be the difference signal. Signal  $a_p$  is the amount of artifact.

In regard to claim 19, a FFT is taken of the signal  $e_m'$ , col 12 lines 20-43.

In regard to claim 23, the linear filter of Halperin et al. computes coefficients, col 11 lines 16-19.

***Claim Rejections - 35 USC § 103***

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3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Halperin et al. (US Patent no. 6,390,996).

In regard to claims 3-5, Halperin et al. substantially describes the invention as claimed, except does not describe the different types of physiological signals that can be used on conjunction with CPR therapy. However, the Examiner considers the physiological signals, and their ascertainment, are well known as well as being art recognized equivalents in the art for aiding in delivery of chest compressions, and therefore using them would have been obvious to one of ordinary skill in the art at the time the invention was made.

5. Claims 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Halperin et al. (US Patent no. 6,390,996) in view of Haberl et al. (US Patent no. 5,211,179).

In regard to claims 20- 22, Halperin et al. describe the invention as claimed except for the filter comprising a FIR filter or that the signal is normalized. Haberl et al. describes a system and a method for analysis of electrocardiogram signals in which they teach that it is a common step in signal processing to normalize a signal, col 1 lines 10-19. Halperin et al. also use an adaptive filter configuration, col 5 lines 7-11, in which the

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filter could be a finite impulse response filter, col 7 lines 25-42. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was to modify the invention of Halperin et al. with the teachings of Haberl et al. since Haberl et al. teach that signal normalization and FIR filters are well known tools and steps in signal processing.

### ***Allowable Subject Matter***

6. Claims 17, 18, 24, 25, 27, and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Double Patenting***

7. Claims 1-29 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 45-52 of U.S. Patent No. 7,220,235.

Although the conflicting claims are not identical, they are not patentably distinct from each other because both recite a method for removing CPR induced artifact from ECG signals using derived velocity information.

### **(10) Response to Argument**

Appellant's arguments regarding claim 1 have been considered, but are found not persuasive.

Regarding Appellant's first argument that due to the rejection being based on an anticipation rejection under Halperin et al., what would be obvious to one of ordinary skill in the art is irrelevant, the Examiner agrees. The Examiner concedes that making

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an obviousness statement in an anticipation rejection is in error, and is a misstatement on the part of the Examiner. However, the teachings pertaining to removal of CPR compression artifact from an ECG contained in the Halperin et al. reference are considered cogent to the relevance of subject matter contained therein and the provide the basis for forming the anticipation rejection.

Regarding Appellant's argument that even if the obviousness rejection were proper, the reasoning is not supported by the teaching of Halperin et al., the Examiner respectfully disagrees. The Appellant argues that the teachings of Halperin et al. are deficient, since they do not provide any indication that a velocity measurement of chest compressions can be used to remove CPR compression artifact from an ECG signal. The Appellant cites column 11 line 59 through column 12 line 19 from Halperin et al. to point out that the Examiner's interpretation of the reference is misconstrued and improper since Halperin et al. uses acceleration measurements to remove the signal artifact.

Halperin et al. teaches that when CPR is administered, the ECG signal recorded from a patient, may be affected by a CPR-induced artifact thereby requiring a process to remove the CPR-induced artifact and render the resulting ECG signal meaningful and intelligible, column 10 lines 1-6. The section referenced by Appellant (column 11 line 59 through column 12 line 19) describes a method through which the ECG signal is processed to remove the artifact. The process acquires an ECG signal,  $e_m$ , during CPR. The  $e_m$  signal is a raw ECG signal containing the true ECG and CPR-induced artifact. A predicted artifact signal,  $a_p$ , and a CPR-induced representative signal,  $a_r$ , are

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produced and used to process the  $e_m$  to remove induced artifact. The result is signal  $e'_m$  which is the true ECG signal free from artifact. This process for removing CPR-induced artifact is a general algorithm (i.e.,  $a_r$  is generic to any signal representing the CPR-induced artifact), and can be performed regardless of what type of measurable signal is used to represent the CPR-induced artifact. Halperin et al. use an acceleration signal for  $a_r$ , however, Halperin et al. only use this signal as an "illustrated embodiment", column 11 lines 56-58; other measurable signals such as force, distance, velocity, motion, etc can be used to represent the signal artifact, column 11 lines 50-56. Velocity is an equivalent value to be used as the  $a_r$  signal in removing CPR-induced artifact from the ECG signal. In view of this, the use of a velocity signal to represent induced artifact is anticipated since it is clearly taught by Halperin et al. that velocity is a suitable measurable signal for doing so.

Regarding Appellant's argument that the gyro sensors cited by Examiner for measuring velocity are only used for correcting hand tilt during compression administration, not for the representing CPR-induced artifact, the Examiner agrees. However, the Examiner disagrees with Appellant's argument that there is no indication anywhere in Halperin et al. for using velocity to remove CPR-induced artifact, the Examiner disagrees. As point out above, Halperin et al. does indeed provide teaching that velocity is a suitable measurable signal for removing CPR-induced artifact, column 11 lines 50-56. If Appellant is asserting that nowhere in the Halperin et al. reference is velocity recorded, the Examiner also disagrees. Not only is angular velocity measured by the gyro sensors, Halperin et al. ensures that adequate chest compression frequency



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(i.e., velocity) is maintained within a desired range, column 3 lines 52-55, column 5 lines 43-47, and column 7 lines 18-22. This suggests that compression velocity is a monitored signal value, and in view of the teachings of column 11 lines 50-56 is an equivalent measurable signal for representing CPR-induced artifact when processing a measured ECG to remove induced artifacts.

In view of the above, the 35 U.S.C. 102(b) rejection under Halperin et al. against claim 1, and depending claims, is maintained.

#### **(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Brian T. Gedeon/

Examiner, Art Unit 3766

24 February 2010

Conferees:

/Carl H. Layno/

Supervisory Patent Examiner, Art Unit 3766

/Melanie Kemper/  
Reviewer, TC 3700

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